DJ11

OVERLAY FOR ITEP

MD-11-DZDJD-B

EP-DZDJD-B-DL-A

NOV 1976

digital

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IDENTIFICATION

PRODUCT CODE:	MAINDEC-11-DZDJD-B-D
PRODUCT NAME:	DJ11 OVERLAY FOR INTERPROCESSOR TEST PROGRAM
PROGRAM DATE:	OCTOBER 1976
MAINTAINER:	DIAGNOSTICS
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1.0     ABSTRACT.

        THIS PROGRAM IS DESIGNED AS A MAINTENANCE AID FOR
        FIELD SERVICE PERSONEL.  IT WILL VERIFY THE PROPER OPERATION
        OF A COMPLETE COMMUNICATION LINK FROM ONE PDP-11
        SYSTEM TO ANOTHER OR TO A COMMUNICATION TEST CENTER.

        THIS PROGRAM MUST BE USED IN CONJUNCTION WITH THE INTERPROCESSOR
        TEST PROGRAM(DZITP) ON A PDP-11 SYSTEM WITH A DL-11 INTERFACE.

2.0     REQUIREMENTS.

2.1     EQUIPMENT

        A.  PDP-11 SYSTEM WITH 4K OF CORE.
        B.  A DJ11 COMMUNICATION INTERFACE.

2.2     STORAGE.

        4K OF CORE

3.0     LOADING PROCEDURE
        THIS PROGRAM IS IN ABSOLUTE FORMAT.
        THE ABS LOADER MUST BE USED TO LOAD THE PROGRAM.

4.0     OPERATING PROCEDURES.

        A.  TWO METHODS OF ENTERING PARAMETERS ARE PROVIDED
            1.  LOAD ADDRESS 200 AND START TO ENTER PARAMS FROM CONSOLE TTY, PROCEED TO SECTION B.
            2.  LOAD ADDRESS 200 AND SET SWITCH REGISTER BIT 15 BEFORE
            STARTING TO ENTER PARAMS FROM CONSOLE SWITCHES, PROCEED TO SECTION C.
            *THE PROGRAM MAY BE RESTARTED AT LOC 204 (ONCE PARAMETERS HAVE ALREADY BEEN SELECTED)

        B.  CONSOLE DIALOGUE PARAMETER INPUT (CURRENT VALUES FOR PARAMETERS ARE FOUND IN OVERLAY)

            1.  THE PROGRAM WILL TYPEOUT THE NAME OF THE VARIABLE OVERLAY.
                A.  IF YOU WISH TO SETUP JUST THE INDICATED OVERLAY, TYPE A CARAGE RETURN
                B.  IF YOU WISH TO SETUP A DN11, TYPE IN DN.
                C.  IF YOU WISH TO SETUP A DM11BB, TYPE IN DMB.

                IF DN OR DMB WAS TYPED IN STEP 1 ABOVE THEN THE BUS ADDRESS,
                VECTOR ETC. REFERED TO IN STEPS 2 THRU 7, PERTAIN TO THE DN11 OR DMBB.

            2.  THE PROGRAM WILL TYPE THE DEFAULT BUS ADDRESS OF THE INTERFACE UNDER TEST.
                A.  TYPE A CAR. RETURN TO USE DEFAULT BUS ADDRESS
                B.  TYPEIN ACTUAL BUS ADDRESS

            3.  THE PROGRAM WILL TYPE OUT THE DEFAULT VECTOR ADDRESS
                A.  TYPE A CAR. RETURN TO USE DEFAULT ADDRESS
                B.  TYPEIN ACTUAL VECTOR ADDRESS

            4.  THE PROGRAM WILL TYPE OUT THE DEFAULT INTERFACE PRIORITY
                NOTE: 200=PRIO 4, 240=PRIO 5, 300=PRIO 6, ETC.
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      A.  TYPE A CAR. RETURN TO USE DEFAULT VALUE
      B.  TYPEIN ACTUAL VALUE

  5.  THE PROGRAM WILL TYPEOUT THE DEFAULT VALUE OF PARAM#1
      IF REQUIRED BY THE ISR.(SEE SECT. 10.0 IN OVERLAY LISTING FOR PARAMETER DESCRIPTION)
      A.  TYPE A CAR. RETURN TO USE DEFAULT VALUE
      B.  TYPEIN ACTUAL VALUE

  6.  THE PROGRAM WILL TYPEOUT THE DEFAULT VALUE OF PARAM#2
      IF REQUIRED BY THE ISR.
          A.  TYPE A CAR. RETURN TO USE DEFAULT VALUE
          B.  ENTER ACTUAL VALUE

  7.  THE PROGRAM WILL TYPEOUT THE DEFAULT VALUE OF PARAM#3
      IF REQUIRED BY THE OVERLAY.
          A.  TYPE A CAR. RETURN TO USE DEFAULT VALUE
              THE DN-11 WILL USE PARAM #3 AS THE # TO DIAL.
              IF USING A MODEM WITHOUT AUTOMATIC HANDSHAKING,
              THE NUMBER MUST TERMINATE WITH A
              "END-OF-NUMBER" CHARACTER (:).
          B.  ENTER ACTUAL VALUE.

  8.  THE PROGRAM WILL RETURN TO STEP B1 IF THIS SETUP
      WAS FOR DN11 OR DM11BB.

  9.  THE PROGRAM WILL REQUEST THAT SWITCH REGISTER BE SET.
          A.  SETUP SWITCH REGISTER AS SPECIFIED IN STEP D.
              AND TYPE A CAR. RETURN.

      NOTE: IF ANY OF THE ABOVE ITEMS 2 THRU 7 WERE CHANGED BY ENTERING
      NEW VALUES,THE NEW VALUE BECOMES THE DEFAULT VALUE FOR SUBSEQUENT
      RESTARTS OF THE PROGRAM.
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          C.  MANUAL PARAMETER INPUT FROM SWITCH REGISTER
              1.  THE PROGRAM HALTS FOR ISR(INTERFACE SERVICE ROUTINE) SPECIFICATION
              SWR14=SETUP DM-11B ISR
              SWR13=SETUP DN-11 ISR
              SWR=000000=SETUP VARIABLE ISR

              2.  THE FOLLOWING HALTS ARE REPEATED FOR EACH ISR SPECIFIED.
                  SETUP SEQUENCE IS: DN11,DM11-BB THEN VARIABLE OVERLAY. (EACH ENTRY SET SWICHES THEN HIT CONTINUE.)
                  A.  HALT FOR BUS ADDRESS OF INTERFACE
                  B.  HALT FOR VECTOR ADDRESS OF INTERFACE
                  C.  HALT FOR PRIORITY OF INTERFACE
                  D.  HALT FOR INTERFACE PARAM #1 (SEE SECT. 10.0 IN OVERLAY LISTING FOR PARAMETER DESCRIPTION)
                  E.  HALT FOR INTERFACE PARAM #2 (DN11 AND DMBB PARAMETERS ARE DISCUSSED IN SECT. 10.0 OF THE MONITOR.
                  F.  GO BACK TO STEP A IF THIS SETUP WAS FOR DN OR DMB.

              3.  HALT FOR OPERATIONAL SWITCH SETTINGS. (SEE STEP D.)
                  A.  PRESS CONTINUE TO START TESTING

         BEFORE ATTEMPTING TO RUN THIS PROGRAM, THE OPERATOR MUST
         ACCERTAIN THE COMPLETE COMMUNICATION LOOP AND PROCEEDURES
         TO BE USED, INCLUDING THE TYPE OF MODEMS, THE TYPE OF
         INTERFACE BEING USED AT THE OTHER CPU AND THE MODES OF OPERATION,
         DATA AND PARAMETERS TO BE USED AT EACH CPU.

         THIS WILL REQUIRED VOCAL COMMUNICATION WITH THE OPERATOR
         AT THE OTHER CPU UNLESS ITS CONFIGURATION AND OPERATION
         ARE FIXED AS A TEST CENTER.

         AFTER DETERMINING THAT THE EQUIPMENTS ARE COMPATIBLE AND
         AGREEING ON THE MODE AND VARIABLE PARAMETERS TO BE USED,
         THE SYSTEM WHICH IS TO RECEIVE DATA FIRST SHOULD BE
         LOADED AND STARTED.  IF THE MODEM BEING USED ON THIS SYSTEM
         HAS AN AUTOMATIC ANSWER FEATURE, IT SHOULD BE ENABLED.

         THE SYSTEM WHICH IS TO TRANSMIT FIRST SHOULD THEN BE LOADED
         AND STARTED AND THE CONNECTION ESTABLISHED EITHER MANUALLY
         OR AUTOMATICALLY (VIA DN-11).
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D.  OPERATIONAL SWITCH SETTINGS.
    SW15=1 HALT ON ERROR
    SW14=1 SINGLE PASS
        SW14 HAS NO EFFECT IF SW04=0
    SW13=1 INHIBIT ERROR TYPEOUTS
    SW12=1 INHIBIT ALL TYPEOUTS EXCEPT ERRORS
        IF SW12=0 AND SW04=1 END PASS IS TYPED
        AND TRANSMITTED/RECEIVED DATA IS TYPED.
    SW11=1 USE PREVIOUSLY SPECIFIED DATA
    SW10=1 DATA SELECT (WITH SW09)
    SW09=1 DATA SELECT (WITH SW10)
        00=1 GET DATA FROM OPERATOR
        01=1 TEST MESSAGE #1 (SA QUICK BROWN FOX)
        10=1 TEST MESSAGE #2 (SB NUMERICS)
        11=1 TEST MESSAGE #3 (SC CONTEST/QUICK BROWN FOX/NUMERICS)
    SW08=1  TRANSMIT RECEIVED DATA (INTERNAL LOOPBACK MODE)
    SW07=1 DO NOT TEST RECEIVED DATA
    SW06=1 MONITOR TRANSMITTED DATA ON CONSOLE TTY.*
    SW05=1 MONITOR RECEIVED DATA ON CONSOLE TTY.*
        * IN MANY CASES, NOT ALL DATA WILL APPEAR ON THE CONSOLE
        TTY. THIS IS ESPECIALLY TRUE WHEN THE COMM INTERFACE IS
        RUNNING AT A FASTER BAUD THAN THE CONSOLE. BUT EVEN AT EQUAL
        OR SLOWER BAUDS, ALL CHARACTERS MAY NOT APPEAR ON THE CONSOLE.

    SW04=1 RETURN TO MONITOR FOR END PASS
        WHEN SW04=0 PROGRAM LOOPS IN THE OVERLAY NEVER RETURNING TO THE MONITOR.
    SW03=1 INTERNAL LOOPBACK MODE
    SW02=1 EXTERNAL LOOPBACK MODE
    SW01=1 ONE-WAY-IN MODE
    SW00=1 ONE-WAY-OUT MODE
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THIS PROGRAM HAS BEEN MODIFIED TO RUN ON A PROCESSOR WITH OR WITHOUT
A HARDWARE SWITCH REGISTER. WHEN FIRST EXECUTED THE PROGRAM TESTS
THE EXISTENCE OF A HARDWARE SWITCH REGISTER. IF NOT FOUND A
SOFTWARE SWITCH REGISTER LOCATION (SWREG=LOC. 176 ) IS DEFAULTED TO.
IF THIS IS THE CASE, UPON EXECUTION THE CONTENTS OF THE SWREG ARE
DUMPED IN OCTAL ON THE CONSOLE TTY AND ANY CHANGES ARE REQUESTED

                (IE)    SWR=XXXXXX  NEW=

POSSIBLE RESPONSES ARE:

1.      <CR>            IF NO CHANGES ARE TO BE MADE
2.      6 DIGITS 0-7    TO REPRESENT IN OCTAL THE NEW SWITCH REGISTER
                        VALUE ;LAST DIGIT FOLLOWED BY <CR>.
3.      ↑U              TO ALLOW REENTERING VALUE IF ERROR IS COMMITTED
                        KEYING IN SWREG VALUE.

BUILT INTO THE PROGRAM IS THE ABILITY TO DYNAMICALLY CHANGE THE
CONTENTS OF SWREG DURING PROGRAM EXECUTION. BY STRIKING ↑G
(CNTL G) ON CONSOLE TTY THE OPERATOR SETS A REQUEST FLAG TO CHANGE
THE CONTENTS OF SWREG, WHICH IS PROCESSED IN KEY AREAS OF THE PROGRAM
CODE (IE) ERROR ROUTINES, AFTER HALTS END OF PASS, AND OTHER
APPLICABLE AREAS.


  IF OPERATOR SPECIFIED DATA WAS INDICATED, THE PROGRAM WILL TYPE A
  REQUEST FOR THE DATA. DATA MAY BE ENTERED AS ASCII CHARACTERS OR OCTAL CODE.
  TYPE IN THE DATA TERMINATED WITH A CR. OCTAL CODE MAY BE ENTERED BY TYPING AN
  ↑(UP ARROW) FOLLOWED BY THE OCTAL CODE (IN THE RANGE 000 TO 377)
  SEPERATED BY SPACES AND TERMINATED BY ↑(UP ARROW).
      I.E.  ABCD↑ 000 123 377↑ EFG (CAR.RETURN)

  A TYPICAL SWITCH SETTING FOR HALF-DUPLEX=003150 THIS SETTING USES
  INTERNAL LOOPBACK MODE, LOOPS IN OVERLAY, MONITORS TRANSMITTED AND RECEIVED
  DATA ON THE CONSOLE TTY, AND TESTS RECEIVED DATA USING TEST MESSAGE #3.

  A TYPICAL SWITCH SETTING FOR FULL-DUPLEX=003144 THIS SETTING
  IS THE SAME AS ABOVE EXCEPT IT USES THE EXTERNAL LOOPBACK MODE.

  ALL STANDARD MESSAGES(TEST MESSAGES 1-3) ARE PRECEDED BY 2 FILL CHARACTERS(177),
  AND ARE FOLLOWED BY A CR(015), LF(012),RECEIVE TERMINATING CHARACTER(001)
  4 FILLS(177), AND A TRANSMIT TERMINATING CHARACTER(000). DURING TRANSMISSION,
  WHEN A 000 CHARACTER IS SEEN THE TRANSMISSION IS STOPPED.DURING RECEPTION,
  WHEN A 001 CHARACTER IS RECEIVED, THE RECEIVER IS SHUT OFF.
  IF THE MESSAGE WAS INPUTED BY THE OPERATER, THE TERMINATING CHARACTERS ARE ADDED.
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        TEST MODES

                INTERNAL LOOPBACK MODE

                1.  THE OVERLAY WAITS TO RECEIVE A MESSAGE (TERMINATED BY <001>)
                2.  VERFIES THE DATA AGAINST THE DATA SELECTED BY SW09 AND SW10(SW7=0)
                3.  TRANSMIT THE DATA SELECTED BY SW09 AND SW10 (SW8=0) OR
                    TRANSMIT THE RECEIVED DATA (SW8=1)
                4.  RETURNS TO MONITOR FOR "END PASS" (SW4=1) OR
                    GO TO STEP 1. (SW4=0)

                EXTERNAL LOOPBACK MODE

                1.  THE OVERLAY SETS REQUEST TO SEND
                2.  WAIT FOR CLEAR TO SEND
                3.  TRANSMITS THE SELECTED DATA
                4.  RESETS REQUEST TO SEND
                5.  WAIT FOR MESSAGE TO BE RECEIVED
                6.  VERIFIES THE DATA (SW07=0)
                7.  RETURNS TO MONITOR FOR "END PASS".  (SW04=1) OR
                    GO TO STEP 1(SW04=0)

                    ONE-WAY-IN MODE

                1.  THE OVERLAY WAITS FOR MESSAGE TO BE RECEIVED.
                2.  VERIFIES THE DATA(SW07=0)
                3.  RETURNS TO MONITOR FOR "END PASS"(SW04=1) OR
                    GO TO STEP 1 (SW04=0)

                    ONE-WAY-OUT MODE

                1.  THE OVERLAY SETS REQUEST TO SEND
                2.  WAITS FOR CLEAR TO SEND
                3.  TRANSMITS SELECTED DATA
                4.  RETURNS TO MONITOR FOR "END PASS". (SW04=1) OR
                    GO TO STEP 1 (SW04=0)

        E.  THE OVERLAY IS THEN ENTERED AND A CONNECTION ESTABLISHED EITHER
            MANUALLY OR AUTOMATICALLY.

            IF ONE-WAY-IN OR INTERNAL LOOPBACK MODES ARE SELECTED.
            THE OVERLAY WILL SET DATA TERMINAL READY AND WAIT FOR DATA.

            IF ONE-WAY-OUT OR EXTERNAL LOOPBACK MODES WERE SELECTED.
            THE OVERLAY WILL SET DATA TERMINAL READY AND REQUEST TO SEND.
            THE OVERLAY WILL THEN WAIT FOR CLEAR TO SEND BEFORE ATTEMPTING TO
            TRANSMIT DATA.

                THE PROGRAM WILL PRINTOUT A "WAITING FOR CLEAR TO SEND"
                MESSAGE AND THE CONTENTS OF THE XMIT CSR EVERY 60 SECS.
                UNTIL CLEAR TO SEND IS ASSERTED.
                F.  IF SW04=0 THE OVERLAY WILL CONTINUE TO
                    TRANSMIT/RECEIVE DATA.

                    IF SW04=1 THE OVERLAY WILL RETURN
                    TO THE MONITOR AND TYPE "END PASS".

                    IF BOTH SW04=1 AND SW14=1, THE PROGRAM WILL REQUEST
                    NEW INTERFACE PARAMS AFTER ONE PASS OF THE SELECTED
                    TEST MODE.

                    TEST EXECUTION MAY BE INTERRUPTED BY TYPING THE FOLLOWING
                    CHARACTERS ON THE CONSOLE TTY.
                    LINE FEED = RESTART PROGRAM AT LOCATION 200.
                    QUESTION MARK = PRINTOUT FIRST 8 WORDS OF INPUT BUFFER.(ASCII)
                                        THEN TYPE EITHER:
                                        #WXXXXXX        TO PRINTOUT THE 8 WORDS
                                                        AT LOC XXXXXX.

                                        #BXXXXXX                TO PRINTOUT THE  16 BYTES
                                                        AFTER LOC XXXXXX.

                                        #C              TO CONTINUE

                                PROGRAM MUST BE RESTARTED AT 200 AFTER PRINTING.
                    CARRIAGE RETURN = RESTART AT REQUEST FOR NEW OPERATIONAL SWITCHES.
        5.0     PROGRAM AND/OR OPERATOR ACTION

                IF THE OPERATOR WISHES TO MANUALY EXAMINE THE TRANSMIT OR RECEIVE
                BUFFERS, DO THE FOLLOWING: TO FIND THE STARTING ADDRESS OF THE RECEIVE
                BUFFER, LOAD ADDRESS 11020 AND EXAMINE. TO FIND THE STARTING ADDRESS
                OF THE TRANSMIT BUFFER, LOAD ADDRESS 11022 AND EXAMINE.

        5.1     NORMAL HALTS
                SEE SECTION 4.


        6.0     ERRORS

        6.1     ERROR REPORTING

                THE ONLY ERROR REPORT FROM THE CONTROL PROGRAM OCCURS IF THE
                INTERFACE SPECIFIED IS NOT LOADED.

                IF DATA IS RECEIVED AND SWITCH 7 (NO DATA COMPARE)
                IS RESET, THE DATA WILL BE COMPARED AGAINST THE PRESELECTED
                DATA AFTER A LINE FEED CHARACTER IS RECEIVED. IF THERE IS A
                MISMATCH,  THE FOLLOWING ERROR REPORT IS PRINTED:


                RECEIVED DATA=RRRRRR
                DATA SHOULD BE TTTTTT
                DATA COMPARE ERROR;  BAD DATA=BBB  GOOD DATA=GGG
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WHERE RRRRRR IS THE RECEIVE BUFFER (UP TO 512 CHARACTERS)
TTTTTT IS THE TRANSMIT BUFFER (UP TO 512 CHARACTERS)
BBB IS THE BAD DATA CHARACTER
GGG IS THE GOOD DATA CHARACTER

IF THE INTERFACE DETECTS A DATA ERROR, THE FOLLOWING WILL BE PRINTED BEFORE THE DATA IS COMPARED:

THERE WAS A RECEIVER ERROR. RECEIVER DATA REGISTER =XXXXXX

WHERE XXXXXX IS THE CONTENTS OF THE RECEIVER DATA REGISTER THE LOW BYTE IS THE DATA, AND THE HIGH BYTE IS THE ERROR BITS.

IF A RECEIVE TERMINATING CHARACTER(001) IS NOT DETECTED WITHIN 512 CHARACTERS A "BUFFER FULL" PRINTOUT WILL OCCUR.

7.0 RESTRICTIONS

THE OPERATION OF THIS PROGRAM REQUIRES COORDINATION BETWEEN THE OPERATOR AND THE OPERATOR OF ANOTHER PDP-11 SYSTEM UNLESS ONE OF THE SYSTEMS IS ALWAYS OPERATING IN A FIXED MODE. THE FOLLOWING TABLE LISTS THE VALID COMBINATIONS:

CPU #1	CPU #2
ONE-WAY-OUT	ONE-WAY-IN
ONE-WAY-IN	ONE-WAY-OUT
EXTERNAL-LOOPBACK	INTERNAL-LOOPBACK
INTERNAL-LOOPBACK	EXTERNAL-LOOPBACK
EXTERNAL-LOOPBACK	EXTERNAL-LOOPBACK (FULL DUPLEX)

WHEN THE COMMUNICATION LINK INVOLVES MODEMS THE FOLLOWING RESTRICTION APPLY:

IF RUNNING IN FULL DUPLEX MODE BOTH SYSTEMS MUST BE IN EXTERNAL LOOP BACK MODE.

BOTH SYSTEMS SHOULD BE RUNNING IDENTICAL ROUTINES.
EXAMPLE:
SWITCHES 14,13,7,4 SHOULD BE THE SAME
ON BOTH CPU'S

IF PROGRAM IS WAITING IN A SCAN ROUTINE AND TYPES OUT A "WAITING MESSAGE" IF AN INCOMING MESSAGE STARTS DURING THE TYPE OUT, IT WILL BE LOST BECAUSE THE TYPEOUT PRIORITY IS AT LEVEL 7. THIS WILL RESULT IN OVERRUN OR SILO OVER-RUN ERRORS, DEPENDING ON THE DEVICE.TO AVOID THIS SITUATION RUN WITH SWITCH 13 UP. IF OVERRUN DOES OCCURE DURING A TYPEOUT THE PROGRAM SHOULD BE RESTARTED.

IF USING AN ASYNCRONOUS DEVICE, MODEMS AND THE MAYNARD TEST STATION AND INITALIZE DOES NOT CLEAR THE CONNECTION (EXAMPLE THE DJ11) IF THE PROGRAM IS RESTARTED IN THE MIDDLE OF A MESSAGE AT LOC 204 OR BY HITTING CR AN IMMEDEATE ERROR MESSAGE FROM MAYNARD WILL BE RE-

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                CEIVED. THIS IS BECAUSE THE TEST STATION IS STILL LOOKING
                 FOR THE REST OF THE INTERUPTED MESSAGE. TO AVOID THIS
                ERROR , RESTART PROGRAM ONLY AT THE END OF THE MESSAGE
                CURRENTLY BEING TRANSMITTED.


        8.0     MISCELLANEOUS

                ITEP WAS CHECKED OUT USING THE FOLLOWING BELL TELEPHONE MODEMS.
                201A (HALF-DUPLEX SYNCHRONOUS 2000 BAUD)
                202C (HALF-DUPLEX ASYNCHRONOUS 1200 BAUD)
                103A (FULL-DUPLEX ASYNCHRONOUS 110 BAUD)


        9.0     PROGRAM DESCRIPTION

        9.1     THE DJ11 INTERFACE SERVICE PARAMS ARE SETUP, AS SPECIFIED BY THE OPERATOR,
                BY THE ITEP CONTROL PROGRAM.

                TIME: PROVIDES A MEANS OF MEASURING ELASPED TIME. IT IS INCREMENTED
                EVERY SECOND BY A CLOCK INTERRUPT ROUTINE IN ITEP.

        9.2     WHEN THE OVERLAY IS FIRST ENTERED BY ITEP AT LOCATION START:,
                THE CONTENTS OF THE SWITCH REGISTER ARE STORED IN REGISTER 0.
                THE MODE AND DATA SELECTIONS ARE FIXED AT THIS TIME AND CANNOT
                BE ALTERED WITHOUT RETURNING TO THE CONTROL PROGRAM.
                THE INTERRUPT VECTORS AND VARIABLES ARE THEN SETUP.
                THE SELECTED ROUTINE DETERMINED BY THE MODE IS THEN ENTERED

        9.3     THE OVERLAY THEN LOOPS IN ROUTINES: SOWI ,IF "ONE WAY IN" MODE
                WAS SELECTED. SOWO,IF "ONE WAY OUT" MODE WAS SELECTED.
                SILB, IF "INTERNAL LOOP BACK" MODE WAS SELECTED.
                SXLB,IF "EXTERNAL LOOP BACK" WAS SELECTED.

        9.31    SOWI: IN THIS ROUTINE THE RECEIVER IS INITIALIZED AND PROGRAM
                LOOPS WAITING FOR THE RECEIVER TO FINISH.IF NOTHING IS RECEIVED
                FOR 60 SECS A "WAITING" MESSAGE IS TYPED. WHEN THE RECEIVER IS
                DONE,THE PROGRAM CHECKS DATA IF SWITCHES PERMIT,AND TYPES END
                PASS DEPENDING ON SWITCH SETTINGS.

        9.32    SOWO: THE TRANSMITTER IS INITIALIZED AND PROGRAM LOOPS
                WAITING FOR TRANSMITTER TO FINISH.A "WAITING" MESSAGE IS TYPED
                EVERY 60 SECS IF THERE IS NO ACTION. WHEN THE TRANSMITTER IS
                DONE. THE PROGRAM EITHER LOOPS BACK TO SOWO OR TYPES END PASS
                DEPENDING ON SWITCH SETTINGS.

        9.33    SILB: THE RECEIVER IS INITIALIZED AND PROGRAM LOOPS WAITING FOR
                RECEIVER TO FINISH, A "WAITING" MESSAGE IS TYPED EVERY 60 SEC
                IF NO ACTION. WHEN RECEIVER IS DONE PROGRAM CHECKS DATA IF SWITCH
                SETTINGS PERMIT, AND END PASS IS TYPED IF SWITCH SETTINGS PERMIT,
                THEN THE TRANSMITTER IS INITIALIZED, A "WAITING" MESSAGE IS TYPED
                EVERY 60 SEC IF NO ACTION. WHEN TRANSMITTER IS DONE PROGRAM RETURNS
                TO START OF ROUTINE. (SILB)

        9.34    SXLB: IF IN HALF DUPLEX THE TRANSMITTER IS INITIALIZED,
                A "WAITING MESSAGE IS TYPED EVERY 60 SEC IF THERE IS NO ACTION
                WHEN THE TRANSMITTER IS DONE THE RECEIVER IS INITIALIZED
                 A "WAITING" MESSAGE IS TYPED EVERY 60 SEC IF THERE IS NO ACTION.
                WHEN THE RECEIVER IS DONE,DATA IS CHECKED IF SWITCH SETTINGS
                PERMIT AND END PASS IS TYPED IF SWITCHES ALLOW.THE PROGRAM NOW
                REPEATS CYCLE STARTING AT SXLB.
                IF IN FULL DUPLEX THE RECEIVER AND TRANSMITTER ARE INITIALIZED
                , A "WAITING" MESSAGE IS TYPED EVERY 60 SEC IF THERE IS NO
                ACTION. WHEN BOTH THE RECEIVER AND TRANSMITTER ARE DONE,DATA IS
                CHECKED, END PASS IS TYPED AND PROGRAM LOOPS TO SXLB DEPENDING
                ON THE SWITCH SETTINGS.

        9.4     THE RETURN TO MONITOR ROUTINE FOR END PASS AT EOP:
                LOCKS OUT INTERUPTS AND SAVES THE TRANSMITTER INTERUPT ENABLE
                BIT AND ALL GENERAL REGISTERS. IT THEN RETURNS TO THE MONITOR
                TO TYPE "END PASS". THE MONITOR CHECKS SW14 IF UP IT RETURNS
                TO ENTER:, OTHERWISE IT RESTARTS THE PROGRAM.

        9.5     ENTER: IS ENTERED FROM THE MONITOR AFTER TYPEING "END PASS",
                IT RESTORES THE GENERAL REGISTERS AND THE TRANSMITTER CSR
                AS SAVED IN EOP. THE DELAY FLAG IS SET AND PROGRAM RETURNS TO
                THE SCAN ROUTINE(OWD,OWI,ILB,XLB) WHERE IT CAME FROM.

        9.6     THE INITIALIZE TRANSMIT SUBROUTINE AT STARTX:
                SETS UP THE INTERFACE AND POINTERS NECESSARY TO
                INITIATE A TRANSMIT OPERATION.
                AFTER SETTING "DATA TERMINAL READY" AND "REQUEST TO SEND" A CHECK
                IS MADE ON PARAM2 TO DETERMINE IF HALF DUPLEX OPERATION
                WAS SELECTED BY THE OPERATOR. IF IT WAS, THE
                SUBROUTINE WAITS FOR CLEAR TO SEND.
                A 'WAITING FOR CLEAR TO SEND' PRINTOUT OCCURS
                EVERY 30 SECONDS UNTIL CLEAR TO SEND IS ASSERTED.

        9.7     THE INITIALIZE RECEIVED SUBROUTINE AT STARTR:
                SETS UP THE INTERFACE AND POINTERS NECESSARY TO
                RECEIVE A MESSAGE.

        9.8     THE TRANSMIT INTERRUPT SERVICE ROUTINE,
                AT XISR:, IS ENTERED VIA TRANSMIT INTERRUPTS
                FROM THE INTERFACE.
                A TEST IS MADE TO SEE IF THE LAST CHARACTER
                TRANSMITTED WAS A NULL (ALL ZEROS) CHARACTER.
                IF IT WAS: THE TRANSMIT LOGIC IN THE INTERFACE
                IS RESET AND THE TRANSMIT COMPLETE FLAG IS SET.
                AT XISR1: THE NEXT CHARACTER IS TRANSMITTED
                AND PRINTED ON THE TTY IF THE MONITOR TRANSMIT
                SWITCH IS SET.

        9.9     THE RECEIVE INTERRUPT SERVICE ROUTINE
                 AT RISR:, IS ENTERED VIA RECEIVER INTERRUPTS
                FROM THE INTERFACE.
                THE RECEIVED CHARACTER IS STORED IN
                THE INPUT BUFFER AND PRINTED ON THE TTY IF
                THE MONITOR RECEIVER SWITCH IS SET.
                IF THE INPUT BUFFER IS FULL, A 'BUFFER FULL'
                PRINTOUT WILL OCCUR. THIS INDICATES THAT A
                LINE FEED CHARACTER WAS NOT RECOGNIZED
                IN THE RECEIVED DATA (WITHIN 1000 CHARACTERS).
                IF THE RECEIVED CHARACTER IS A LINE FEED,
                THE RECEIVED LOGIC IS RESET AND THE
                RECEIVE COMPLETE FLAG IS SET.
                IF A 'RECEIVE ERROR' IS DETECTED AT RISR:, THE
                CSR AND DBR WILL BE SAVED AND PRINTED OUT
                AFTER THE COMPLETE MESSAGE HAS BEEN RECEIVED.

        9.10    THE DATA TEST SUBROUTINE AT TESTD: IS
                ENTERED AFTER A COMPLETE MESSAGE HAS BEEN
                RECEIVED.
                IF A 'RECEIVE ERROR' HAD BEEN DETECTED,
                THE CONTENTS OF THE 'RECEIVE BUFFER' AT THE
                TIME THE ERROR OCCURRED WILL BE PRINTED.
                THE DATA IS COMPARED UNTIL A 'ALL ZEROS'
                CHARACTER IS RECOGNIZED. 'FILL' (ALL ONES)
                CHARACTERS ARE IGNORED. IF A MISMATCH
                IS DETECTED, THE COMPLETE CONTENTS OF THE
                INPUT BUFFER AND GOOD DATA IS PRINTED.


        10.0    PARAMETERS FOR THE DJ11

                PARAM#1 IS THE LINE NUMBER IN OCTAL, DEFAULT= LINE 0

                PARAM#2 BIT 0 IS FULL DUPLEX (1), DEFAULT= FULL DUPLEX (1)

                PARAM#3 IS NOT USED (177777)
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                                    ;*******************************************************
                                    ;       DJ11 INTERFACE SERVICE PARAMS
                                    ;*******************************************************
                011000                      .=11000
        011000  045104  000040      DJ11:   .ASCIZ  /DJ /                   ;ISR NAME
        011004  160010              BA:     160010                          ;BUS ADDRESS
        011006  000300              RIV:    300                             ;VECTOR ADDRESS
        011010  000240              PRIOR:  240                             ;PRIORITY
        011012  000000              PARAM1: 0                               ;PARAM #1
        011014  000001              PARAM2: 1                               ;PARAM #2
        011016  177777              PARAM3: 177777                          ;PARAM #3
        011020  000000              IRDA:   .WORD   0                       ;INITIAL READ DATA ADDRESS
        011022  000000              IXDA:   .WORD   0                       ;INITIAL XMIT DATA ADDRESS
        011024  000000              SETTLE: .WORD   0                       ;LINE SETTLE DELAY FLAG
        011026  000000                      .WORD   0                       ;
        011030  000000              B2016:  .WORD   0                       ;ADDR OF BIN TO OCT TYPE ROUTINE
        011032  000000              TIME:   .WORD   0                       ;TIMER
        011034  000000                      .WORD   0                       ;
        011036  011102                      .WORD   START                   ;ADDR OF START OF PROGRAM
        011040                      TX.TERM:
        011040     000                      .BYTE   000                     ;TRANSMITTER TERMINATING CHAR.
        011041                      RX.TERM:
        011041     001                      .BYTE   001                     ;RECEIVER TERMINATING CHAR.
        011042  000000              FLAG:   .WORD   0
        011044  177570              SWR:    177570
        011046  177570              DISPLAY:177570




                                    ;*******************************************************
                                    ;       CONSTANTS + WORKING STORAGE
                                    ;*******************************************************
                000000                      STAT=R0
                100000                      XFLG=100000                     ;XMIT COMPLETE FLAG
                040000                      RFLG=40000                      ;RCV COMPLETE FLAG
                020000                      DSFLG=20000                     ;DATA SET STATUS CHANGE FLAG
                020000                      BIT13=20000                     ;INHIBIT PRINTOUTS

        011050  000000              SXCSR:  0                               ;SAVED XMIT CSR
        011052  000000              SRCSR:  0                               ;SAVED RCV CSR
        011054  000000              ERCSR:  0                               ;RCV CSR SAVED ON ERROR
        011056  000000              ERDBR:  0                               ;RCV DATA REG SAVED ON ERROR
        011060  000000              DSSTAT: 0                               ;RCV CSR SAVED ON DS CHANGE

        011062  000000              XCC:    0                               ;XMIT CHAR COUNT
        011064  000000              RCC:    0                               ;RCV CHAR COUNT
        011066  000000              RDA:    0                               ;RCV DATA ADDR.
        011070  000000              XDA:    0                               ;XMIT DATA ADDR.

        011072  177560              TKS:    177560
        011074  177562              TKB:    177562
        011076  177564              TPS:    177564
        011100  177566              TPB:    177566

                000001              FULL.DUPLEX=000001
```

```
                                        ;**************************************************
                                        ;          DJ11-X INTERFACE SERVICE ROUTINE
                                        ;**************************************************
 011102  000240                         START:  NOP
 011104  017700  177774                         MOV     @SWR,   R0      ;SETUP MODE IN R0
 011110  042700  177400                         BIC     #177400,        R0      ;STRIP JUNK
 011114  012702  011006                         MOV     #IV,    R2      ;SETUP
 011120  012722  012710                         MOV     #RISR,  (R2)+   ;INTERRUPT
 011124  012722  011010                         MOV     PRIOR,  (R2)+   ;VECTORS
 011130  012722  012406                         MOV     #XISR,  (R2)+   ;
 011134  012722  011010                         MOV     PRIOR,  (R2)+   ;
 011140  012704  011004                         MOV     BA,     R4      ;SETUP BUS ADDR INDEX
 011144  012714  011012                         MOV     PARAM1, @RCSR   ;SETUP VARIABLES
 011150  012702  011014                         MOV     PARAM2,R2       ;
 011154  042702  000001                         BIC     #0001,R2        ;
 011160  010264  000004                         MOV     R2,     XCSR(R4);IN CSR'S
 011164  005014                                 CLR     @RCSR
 011166  005064  000004                         CLR     TCR(R4)
 011172  042714  000001                         BIC     #RCEN,@RCSR     ;CLEAR RECEIVER ENABLE
 011176  052714  000010                         BIS     #MOSC,@RCSR     ;CLEAR SILO+UARTS
 011202  032714  000020                 1$:     BIT     #BSY,@RCSR      ;CLEAR PULSE DONE?
 011206  001375                                 BNE     1$              ;BR IF NO
 011210  032727  000001  011014                 BIT     #FULL.DUPLEX,PARAM2     ;FULL DUPLEX?
 011216  001002                                 BNE     2$              ;BR IF YES
 011220  052714  000002                         BIS     #HD,@RCSR       ;SET HALF DUPLEX
 011224  123727  011012  000017         2$:     CMPB    PARAM1,#17
 011232  101403                                 BLOS    3$
 011234  104000                                 HLT     0               ;ERROR HLT
 011236  000000                                 HALT                    ;NUMBER IN PARAM1 IS TOO LARGE!
 011240  000776                                 BR      .-2             ;MUST BE 17 OR LESS (LINE# IN OCTAL)
 011242  010046                         3$:     MOV     R0,-(SP)        ;SAVE R0
 011244  012700  000001                         MOV     #1,R0
 011250  013701  011012                         MOV     PARAM1,R1
 011254  005701                         4$:     TST     R1
 011256  001403                                 BEQ     5$              ;CALCULATE TCR BIT
 011260  006300                                 ASL     R0
 011262  005301                                 DEC     R1
 011264  000773                                 BR      4$
 011266  010037  012660                 5$:     MOV     R0,TCRTMP
 011272  012600                                 MOV     (SP)+,R0
 011274  005037  011020                         CLR     TIME            ;RESET TIME
 011300  005037  013174                         CLR     DELAY           ;RESET DELAY

                                        ;****************************************
                                        ;       ROUTINE USED TO GOTO
                                        ;       SUBROUTINE DEPENDENT
                                        ;       ON MODE SELECTED.
                                        ;****************************************

 011304  005037  011020                 GO:     CLR     TIME
 011310  005037  013174                         CLR     DELAY
 011314  005037  012600                         CLR     STOP
 011320  032700  000001                         BIT     #MONO,MODE
 011324  001402                                 BEQ     1$
 011326  000137  011502                         JMP     @MONO
 011332  032700  000002                 1$:     BIT     #MONI,MODE
 011336  001402                          BEQ     2$
 011340  000137  011374                  JMP     SOWI
 011344  032700  000010          2$:     BIT     #ILB,MODE
 011350  001402                          BEQ     3$
 011352  000137  011600                  JMP     SILB
 011356  032700  000004          3$:     BIT     #XLB,MODE
 011362  001402                          BEQ     4$
 011364  000137  012030                  JMP     SXLB
 011370  000000                  4$:     HALT
 011372  000776                          BR      .-2




                                 ;*******************************************************************
                                 ;       ROUTINE USED IF "ONE WAY IN" MODE WAS SELECTED.
                                 ;       NOTE THAT WHEN IN THIS MODE HALF DUPLEX IS THE
                                 ;       ONLY MODE AVAILABLE.
                                 ;       "ONE WAY IN" MEANS THAT ONLY THE RECEIVER IS
                                 ;       ENABLED. THE TRANSMITTER IS NEVER "TURNED ON".
                                 ;*******************************************************************



 011374  104416                  SOWI:   KBDIN
 011376  004727  012556                  JSR     PC,STARTR
 011402  032700  040000          1$:     BIT     #AFLG,STAT
 011406  001012                          BNE     2$
 011410  022727  011032  000100          CMP     TIME,#100
 011416  103771                          BLO     1$
 011420  011402                          MOV     @RCSR,R2
 011422  016403  000004                  MOV     XCSR(R4),R3
 011426  104001                          HLT     1
 011430  005037  011032                  CLR     TIME
 011434  000762                          BR      1$

 011436  032777  000200  177400  2$:     BIT     #MODAT,@BWR
 011444  001002                          BNE     3$
 011446  004737  012420                  JSR     PC,TESTD
 011452  042700  040000          3$:     BIC     #AFLG,STAT
 011456  032777  000020  177360          BIT     #LOOP,@BWR
 011464  001405                          BEQ     4$
 011466  012737  011500  013176          MOV     #4$,BACK
 011474  000137  012250                  JMP     EOP
 011500  000736                  4$:     BR      SOWI



                                 ;*******************************************************************
                                 ;       ROUTINE USED IF "ONE WAY OUT" WAS SELECTED.
                                 ;       NOTE THAT WHEN IN THIS MODE HALF DUPLEX IS THE ONLY
                                 ;       MODE AVAILABLE.
                                 ;       "ONE WAY OUT" MEANS THAT ONLY THE TRANSMITTER IS
                                 ;       ENABLED. THE RECEIVER IS NEVER "TURNED ON.
                                 ;*******************************************************************

 011502  104416                  SOWO:   KBDIN
```

```
  737  011504  004737  013202                 JSR     PC,STARTX
  738  011510  005037  011032                 CLR     TIME
  739  011514  032700  100000         1$:     BIT     #XFLG,STAT
  740  011520  001013                         BNE     2$
  741  011522  023727  011032  000100         CMP     TIME,#100
  742  011530  103771                         BLO     1$
  743  011532  011402                         MOV     @RCSR,R2
  744  011534  016403  000004                 MOV     XCSR(R4),R3
  745  011540  104001                         HLT     1
  746  011542  005037  011032                 CLR     TIME
  747  011546  000761                         BR      1$
  748  011550  042700  100000         2$:     BIC     #XFLG,STAT
  749  011554  032777  000020  177262         BIT     #LOOP,@SWR
  750  011562  001405                         BEQ     3$
  751  011564  012737  011576  013176         MOV     #3$,BACK
  752  011572  000137  012260                 JMP     EOP
  753  011576  000741                 3$:     BR      SOWO
  754
  755
  756
```

```
                                        ;******************************************************
                                        ;       ROUTINE USED IF INTERNAL LOOP BACK" WAS SELECTED.
                                        ;       NOTE THAT WHEN IN THIS MODE; HALF DUPLEX IS THE
                                        ;       ONLY MODE AVAILABLE.
                                        ;       "INTERNAL LOOP BACK" MEANS THAT THE RECEIVER IS "TURNED ON"
                                        ;       AND A COMLPETE MESSAGE IS RECEIVED. IF DATA IS TO BE CHECKED
                                        ;       IT IS; IF "END PASS" IS DESIRED; IT IS GIVEN.
                                        ;       THEN THE TRANSMITTER IS ENABLED. AFTER THE WHOLE MESSAGE
                                        ;       IS TRANSMITTED; THE CYCLE IS REPETED AS ABOVE.
                                        ;******************************************************

 011600  104416                         SILB:   KBDIN
 011602  004737  013566                         JSR     PC,STARTR
 011606  005037  011032                         CLR     TIME
 011612  032700  040000                 1$:     BIT     #RFLG,STAT
 011616  001013                                 BNE     2$
 011620  023727  011032  000100                 CMP     TIME,#100
 011626  103771                                 BLO     1$
 011630  011402                                 MOV     @RCSR,R2
 011632  016403  000004                         MOV     XCSR(R4),R3
 011636  104001                                 HLT     1
 011640  005037  011032                         CLR     TIME
 011644  000762                                 BR      1$
 011646  032777  000200  177170         2$:     BIT     #NODAT,@SWR
 011654  001002                                 BNE     3$
 011656  004737  012420                         JSR     PC,TESTD
 011662  042700  040000                 3$:     BIC     #RFLG,STAT
 011666  032777  000020  177150                 BIT     #LOOP,@SWR
 011674  001405                                 BEQ     4$
 011676  012737  011710  013176                 MOV     #4$,BACK
 011704  000137  012260                         JMP     EOP
 011710  032777  000400  177126         4$:     BIT     #400,   @SWR            ;USE EXTERNAL DATA?
 011716  001416                                 BEQ     7$                      ;BR IF NO
 011720  013702  011020                         MOV     IRDA,   R2              ;SET POINTER
 011724  013703  011022                         MOV     IXDA,   R3              ;SET POINTER
 011730  010337  011070                         MOV     R3,     XDA             ;SETUP XMIT DATA ADDR
 011734  112223                                 MOVB    (R2)+,  (R3)+           ;MOVE INPUT TO OUTPUT
 011736  001376                                 BNE     .-2                     ;LOOP IF NOT ZERO CHAR
 011740  112743  000177                         MOVB    #177,   -(R3)           ;INSERT A FILL CHAR
 011744  005203                                 INC     R3                      ;BUMP ADDRESS
 011746  112723  000177                         MOVB    #177,   (R3)+           ;INSERT ANOTHER FILL
 011752  105023                                 CLRB    (R3)+                   ;INSERT ZERO CHAR
 011754  005037  011032                 7$:     CLR     TIME
 011760  004737  013202                         JSR     PC,STARTX
 011764  032700  100000                 5$:     BIT     #XFLG,STAT
 011770  001013                                 BNE     6$
 011772  023727  011032  000100                 CMP     TIME,#100
 012000  103771                                 BLO     5$
 012002  011402                                 MOV     @RCSR,R2
 012004  016403  000004                         MOV     XCSR(R4),R3
 012010  104001                                 HLT     1
 012012  005037  011032                         CLR     TIME
 012016  000762                                 BR      5$
 012020  042700  100000                 6$:     BIC     #XFLG,STAT
 012024  000137  011600                         JMP     SILB
```

```
                                            ;*****************************************************************
                                            ;       ROUTINE USED IF "EXTERNAL LOOP BACK" WAS SELECTED.
                                            ;       EITHER HALF OR FULL DUPLEX MAY BE SELECTED IN THIS MODE.
                                            ;       "EXTERNAL LOOP BACK" MEANS THAT THE TRANSMITTER IS FIRST
                                            ;       TURNED ON (IF HALF DUPLEX) AND THE WHOLE MESSAGE IS TRANSMITTED;
                                            ;       THEN THE RECEIVER IS ENABLED. AFTER THE WHOLE MESSAGE IS RECEIVED
                                            ;       DATA WILL THEN BE CHECKED IF DESIRED AND END PASS WILL
                                            ;       BE GIVEN IF DESIRED.    THEN THE CYCLE IS REPEATED
                                            ;       AS ABOVE.  IF RUNNING IN FULL DUPLEX THE PROGRAM
                                            ;       WAITS FOR BOTH THE RECEIVER AND TRANSMITTER TO
                                            ;       FINISH THEN RESTARTS THE RECEIVER AND TRANSMITTER.
                                            ;*****************************************************************
      012030  104416                        SXLB:   KBDIN
      012032  032737  000001  011014                BIT     #FULL.DUPLEX,PARAM2
      012040  001402                                BEQ     1$
      012042  004737  013566                        JSR     PC,STARTR
      012046  004737  013202                1$:     JSR     PC,STARTX
      012052  005037  011032                        CLR     TIME
      012056  032700  100000                2$:     BIT     #XFLG,STAT
      012062  001016                                BNE     3$
      012064  032700  040000                7$:     BIT     #RFLG,STAT
      012070  001024                                BNE     4$
      012072  023727  011032  000100                CMP     TIME,#100
      012100  103766                                BLO     2$
      012102  011402                                MOV     @RCSR,R2
      012104  016403  000004                        MOV     XCSR(R4),R3
      012110  104001                                HLT     1
      012112  005037  011032                        CLR     TIME
      012116  000757                                BR      2$
      012120  032737  000001  011014        3$:     BIT     #FULL.DUPLEX,PARAM2
      012126  001356                                BNE     7$
      012130  042700  100000                        BIC     #XFLG,STAT
      012134  004737  013566                        JSR     PC,STARTR
      012140  000746                                BR      2$
      012142  032737  000001  011014        4$:     BIT     #FULL.DUPLEX,PARAM2
      012150  001420                                BEQ     8$
      012152  032700  100000                        BIT     #XFLG,STAT
      012156  001013                                BNE     6$
      012160  023727  011032  000100                CMP     TIME,#100
      012166  103765                                BLO     4$
      012170  011402                                MOV     @RCSR,R2
      012172  016403  000004                        MOV     XCSR(R4),R3
      012176  104001                                HLT     1
      012200  005037  011032                        CLR     TIME
      012204  000756                                BR      4$
      012206  042700  100000                6$:     BIC     #XFLG,STAT
      012212  042700  040000                8$:     BIC     #RFLG,STAT
      012216  005037  011032                        CLR     TIME
      012222  032777  000200  176614                BIT     #NODAT,@SWR
      012230  001002                                BNE     5$
      012232  004737  012420                        JSR     PC,TESTD
      012236  032777  000020  176600        5$:     BIT     #LOOP,@SWR
      012244  001671                                BEQ     SXLB
      012246  012737  012030  013176                MOV     #SXLB,BACK
      012254  000137  012260                        JMP     EOP
```

```
                                        ;******************************
                                        ;       ROUTINE TO RETURN
                                        ;       TO MONITOR FOR
                                        ;       END PASS.
                                        ;
                                        ;******************************
012260                                  EOP:
012260  104414  000340                          STPS,PRTY7              ;SET PS PRIORITY TO 7
012264  016437  000004  012416                  MOV     XCSR(R4),QTPIE  ;SAVE TX CSR
012272  042737  137777  012416                  BIC     #↑C<TIE>,QTPIE  ;CLEAR ALL BUT TX IE.
012300  042764  040000  000004                  BIC     #TIE,XCSR(R4)   ;CLEAR TX IE (EVEN IF IT WASN'T SET)
012306  012766  012346  000002                  MOV     #ENTER,2(SP)    ;SET FOR RETURN IF SW 14=1
012314  010037  013160                          MOV     R0,SAVR0        ;SAVE REGISTER 0
012320  010137  013162                          MOV     R1,SAVR1        ;SAVE REGISTER 1
012324  010237  013164                          MOV     R2,SAVR2        ;SAVE REGISTER 2
012330  010337  013166                          MOV     R3,SAVR3        ;SAVE REGISTER 3
012334  010437  013170                          MOV     R4,SAVR4        ;SAVE REGISTER 4
012340  010537  013172                          MOV     R5,SAVR5        ;SAVE REGISTER 5
012344  000207                                  RTS     PC              ;RETURN TO CONTROL PROGRAM

012346                                  ENTER:
012346  013700  013160                          MOV     SAVR0,R0        ;RESTORE R0
012352  013701  013162                          MOV     SAVR1,R1        ;RESTORE R1
012356  013702  013164                          MOV     SAVR2,R2        ;RESTORE R2
012362  013703  013166                          MOV     SAVR3,R3        ;RESTORE R3
012366  013704  013170                          MOV     SAVR4,R4        ;RESTORE R4
012372  013705  013172                          MOV     SAVR5,R5        ;RESTORE R5
012376  012737  177777  013174                  MOV     #-1,DELAY
012404  053764  012416  000004                  BIS     QTPIE,XCSR(R4)  ;IF ORGINALLY SET; SET TX IE
012412  000177  000560                          JMP     @BACK
012416  000000                          QTPIE:  000000



                                        ;********************************
                                        ;     : SUBROUTINE TO CHECK
                                        ;       RECEIVER DATA.
                                        ;
                                        ;********************************
012420  013746  011056                  TESTD:  MOV     ERDBR,  -(SP)   ;WAS THERE A RECEIVE ERROR?
012424  001413                                  BEQ     TSTDAT          ;BR IF NO
012426  032777  020000  176410                  BIT     #BIT13,@SWR     ;INHIBIT PRINTOUTS?
012434  001007                                  BNE     TSTDAT          ;BR IF YES
012436  104400  012620                          TYPE    ,MSG0           ;(15)(12)THERE WAS A RECEIVE ERROR. RBUF=
012442  004077  176362                          JSR     R0,@2016        ;PRINT CONTENTS OF RBUF
012446  005746                                  TST     -(SP)
012450  104400  012701                          TYPE    ,MSG1           ;(15)(12)
012454  013701  011022                  TSTDAT: MOV     IXDA,   R1      ;SETUP XMIT DATA ADDR
012460  013702  011020                          MOV     IRDA,   R2      ;SETUP RCV DATA ADDR
012464  122122                          SCAN4:  CMPB    (R1)+,  (R2)+   ;DATA OK ?
012466  001776                                  BEQ     SCAN4           ;BR IF OK
012470  123741  011040                          CMPB    TX.TERM,-(R1)   ;IS IT END OF DATA
012474  001447                                  BEQ     TESTDX          ;BR IF YES
012476  122742  000002                          CMPB    #002,-(R2)
012502  001005                                  BNE     2$
012504  010237  012512                          MOV     R2,1$
012510  104400                                  TYPE
```

H02

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DJ11 ITEP OVERLAY       MACY11 27(1006)  29-OCT-76  14:40  PAGE 21
DZDJDB.P11     05-AUG-76 09:21

   924  012512  000000                          1$:     .WORD   0
   925  012514  000437                                  BR      TESTDX
   926  012516                                  2$:
   927  012516  105712                                  TSTB    (R2)                    ;
   928  012520  001435                                  BEQ     TESTDX                  ;BR IF YES
   929  012522  122721  000177                          CMPB    #177,     (R1)+         ;IS IT FILL CHAR?
   930  012526  001756                                  BEQ     SCAN4                   ;BR IF YES
   931  012530  005301                                  DEC     R1                      ;BACKUP
   932  012532  122722  000177                          CMPB    #177,     (R2)+         ;IS IT FILL?
   933  012536  001752                                  BEQ     SCAN4                   ;BR IF YES
   934  012540  000240                          SCAN5:  NOP                             ;DATA ERROR
   935  012542  032777  020000  176274                  BIT     #BIT13,@SWR             ;INHIBIT PRINTOUTS
   936  012550  001016                                  BNE     DERR                    ;BR IF YES
   937  012552  104400  012704                          TYPE    ,MSG2                   ;<15><12>RECEIVED DATA = <15><12>
   938  012556  013737  011020  012566                  MOV     IRDA,     RDAX          ;SETUP DATA ADRESS
   939  012564  104400                                  TYPE                            ;PRINT RECEIVED DATA
   940  012566  000000                          RDAX:   0                               ;RECEIVED DATA ADDR.
   941  012570  104400  012731                          TYPE    ,MSG3                   ;<15><12>DATA SHOULD BE<15><12>
   942  012574  013737  011022  012604                  MOV     IXDA,     .+10          ;SETUP ADDR.
   943  012602  104400                                  TYPE                            ;PRINT GOOD DATA
   944  012604  011022                                  IXDA
   945  012606  111103                          DERR:   MOVB    (R1),R3 ;SETUP XMIT DATA
   946  012610  114202                                  MOVB    -(R2),R2         -      ;SETUP RCV DATA
   947  012612  104007                                  HLT+7                           ;DATA ERROR HALT
   948  012614  005726                          TESTDX: TST     (SP)+                   ;POP STACK
   949  012616  000207                                  RTS     PC                      ;RETURN FROM SUB/ROUT
   950
   951  012620  005015  044124  051105  MSG0:   .ASCIZ  <15><12>/THERE WAS A RECEIVER ERROR. REGISTER (SEL 2) =/
   (1)  012701     015  000012          MSG1:   .ASCIZ  <15><12>
   (1)  012704  005015  042522  042503  MSG2:   .ASCIZ  <15><12>/RECEIVED DATA = /<15><12>
   (1)  012731     015  042012  052101  MSG3:   .ASCIZ  <15><12>/DATA SHOULD BE/<15><12>
   (1)  012754  005015  046120  040505  MSG4:   .ASCII <15><12>/PLEASE MAKE CONNECTION (DIAL NUMBER)./
   (1)  013023     015  053412  042510          .ASCIZ <15><12>/WHEN CONNECTION COMPLETE, HIT CONTINUE SWITCH./<15><12>
   (1)  013106  005015  046120  040505  MSG5:   .ASCIZ <15><12>/PLEASE MAKE CONNECTION (DIAL NUMBER)./<15><12>
   (1)                                          .EVEN
   (1)  013160  000000                          SAVR0:  0
   952  013162  000000                          SAVR1:  0
   953  013164  000000                          SAVR2:  0
   954  013166  000000                          SAVR3:  0
   955  013170  000000                          SAVR4:  0
   956  013172  000000                          SAVR5:  0
   957  013174  000000                          DELAY:  0
   958  013176  000000                          BACK:   0
   959  013200  000000                          STOP:   0
   960
```

```
                                                ;**********************************************************
                                                ;       TRANSMITTER INITIALIZATION SUBROUTINE
                                                ;**********************************************************
013202  005737  013174          STARTX: TST     DELAY                   ;IF SW04=1 & SW14=0 DELAY
013206  001416                          BEQ     1$                      ;NO DELAY START TRANSMITTER
013210  005037  013554                  CLR     TEMP1                   ;PREPARE FOR DELAY
013214  012737  000007  013556          MOV     #7,TEMP2
013222  062737  000001  013554          ADD     #1,TEMP1                ;INCREMENT DELAY
013230  001374                          BNE     .-6
013232  005337  013556                  DEC     TEMP2
013236  001371                          BNE     .-14
013240  005037  013174                  CLR     DELAY
013244  042700  100000          1$:     BIC     #XFLG,STAT
013250  013737  011022  011070          MOV     IXDA,XDA                ;SET UP XMIT DATA ADD
013256  005737  013200                  TST     STOP                    ;FIRST TIME HERE?
013262  001021                          BNE     2$                      ;NO
013264  104400  012754                  TYPE    ,MSG4                   ;MAKE CONNECTION
013270  000000                          HALT
013272  005137  013200                  COM     STOP                    ;COMPLEMENT STOP
013276  005037  013554                  CLR     TEMP1                   ;YES PREPARE FOR DELAY
013302  012737  000030  013556          MOV     #14*2,TEMP2
013310  062737  000001  013554          ADD     #1,TEMP1                ;INCREMENT DELAY
013316  001374                          BNE     .-6
013320  005337  013556                  DEC     TEMP2
013324  001371                          BNE     .-14
013326  042714  002000          2$:     BIC     #MWBK,@RCSR             ;SELECT TCR
013332  013764  013560  000004          MOV     TCRTMP,TCR(R4)          ;SET LINE # IN TCR
013340  032737  000001  011014          BIT     #FULL.DUPLEX,PARAM2;FULL DUPLEX?
013346  001414                          BEQ     3$                      ;BR IF NO
013350  032700  000004                  BIT     #XLB,MODE               ;XLB MODE?
013354  001411                          BEQ     3$                      ;BR IF NO
013356  012737  177777  013564          MOV     #-1,TRNFLG              ;SET FLAG
013364  052714  040400                  BIS     #TIE+MTSE,@RCSR ;SET INTERUPT ENABLE
013370  000001                          WAIT
013372  005737  013562                  TST     SNCFLG                  ;FIRST CHAR RECEIVED YET?
013376  001375                          BNE     .-4                     ;BR IF NO
013400  052714  040400          3$:     BIS     #TIE+MTSE,@RCSR ;SET INTERUPT ENABLE,SCAN ENABLE
013404  000207                          RTS     PC

013406  127737  175456  011040  XISR:   CMPB    @XDA,TX.TERM            ;IS CHAR TRANSMITTER TERMINATION CHAR
013414  001005                          BNE     XISR1                   ;BR IF NO
013416  052700  100000                  BIS     #XFLG,STAT              ;SET XMIT DONE FLAG
013422  042714  040400                  BIC     #TIE+MTSE,@RCSR ;CLEAR ENABLES
013426  000444                          BR      XISR3
013430  005737  011012          XISR1:  TST     PARAM1                  ;IS IT LINE 0
013434  001015                          BNE     XISR2                   ;BR IF NO
013436  105764  000007                  TSTB    XBUF+1(R4)              ;DID SCAN STOP AT LINE 0
013442  001412                          BEQ     XISR2                   ;BR IF YES
013444  016437  000006  013562          MOV     XBUF(R4),ERROR1 ;SAVE XBUF
013452  011402                          MOV     @RCSR,R2                ;SET UP R2 WITH SCR CONTENTS
013454  005003                          CLR     R3
013456  104010                          HLT     10                      ;ERROR WRONG LINE
013460  104400  014135                  TYPE    ,SCANE                  ;TYPE ERROR MESSAGE
013464  000000                          HALT                            ;HALT
013466  000776                          BR      .-2
```

```
 1017  013470  117764  175374  000006  XISR2:   MOVB    @XDA,XBUF(R4)       ;TRANSMIT DATA
 1018  013476  032777  000100  175340           BIT     #100,@SWR           ;MONITOR TX DATA?
 1019  013504  001406                            BEQ     NOXMON              ;BR IF NO
 1020  013506  105777  175364                    TSTB    @TPS                ;TTY READY?
 1021  013512  100003                            BPL     NOXMON              ;BR IF NO
 1022  013514  117777  175350  175356           MOVB    @XDA,@TPB           ;TYPE CHAR
 1023  013522  005237  011070          NOXMON:   INC     XDA                 ;INC TXBUF POINTER
 1024  013526  005737  013564                    TST     TRNFLG
 1025  013532  001402                            BEQ     XISR3
 1026  013534  042714  040400                    BIC     #TIE+MTSE,@RCSR
 1027  013540  005037  011032          XISR3:    CLR     TIME
 1028  013544  005037  013564                    CLR     TRNFLG
 1029  013550  000002                            RTI
 1030  013552  000000                  ERROR1:   0
 1031  013554  000000                  TEMP1:    0
 1032  013556  000000                  TEMP2:    0
 1033  013560  000000                  TCRTMP:   0
 1034  013562  000000                  SNCFLG:   0
 1035  013564  000000                  TRNFLG:   0
```

```
   1036                                          ;*******************************************************
   1037                                          ;        RECEIVER INITIALIZATION SUBROUTINE
   1038                                          ;*******************************************************
   1039
   1040  013566  005737  013200          STARTR: TST     STOP            ;FIRST TIME HERE?
   1041  013572  001005                          BNE     1$              ;BR IF NO
   1042  013574  104400  012754                  TYPE    ,MSG4           ;TYPE"MAKE CONNECTION"
   1043  013600  005137  013200                  COM     STOP            ;COMPLEMENT STOP
   1044  013604  000000                          HALT
   1045  013606  032737  000001  011014  1$:     BIT     #FULL.DUPLEX,PARAM2;FULL DUPLEX?
   1046  013614  001410                          BEQ     2$              ;BR IF NO
   1047  013616  032700  000004                  BIT     #XLB,MODE       ;XLB MODE?
   1048  013622  001405                          BEQ     2$              ;BR IF NO
   1049  013624  005037  012654                  CLR     TEMP1           ;START DELAY
   1050  013630  005237  012654                  INC     TEMP1
   1051  013634  001375                          BNE     .-4
   1052  013636  042700  040000          2$:     BIC     #RFLG,STAT
   1053  013642  013737  011020  011066          MOV     IRDA,RDA        ;SET UP RECEIVER DATA ADD
   1054  013650  012737  001000  011064          MOV     #1000,RCC       ;SET UP BUFFER LIMIT
   1055  013656  012737  177777  013562          MOV     #-1,SNCFLG
   1056  013664  005037  011054                  CLR     ERCSR           ;CLEAR ERROR RECORDS
   1057  013670  005037  011056                  CLR     ERDBR
   1058  013674  005764  000002          3$:     TST     RBUF(R4)        ;CLEAR SILO
   1059  013700  100775                          BMI     3$              ;KEEP CLEARING UNTIL BIT 15 CLEAR
   1060  013702  052714  000101                  BIS     #RCEN+RIE,@RCSR ;SET INTERUPT ENABLE,RECEIVER ENABLE
   1061  013706  000207                          RTS     PC
   1062
   1063  013710  000240                  RISR:   NOP
   1064  013712  105714                          TSTB    @RCSR           ;DID RECEIVER DONE SET?
   1065  013714  100403                          BMI     1$              ;BR IF YES
   1066  013716  011402                          MOV     @RCSR,R2        ;SAVE CSR
   1067  013720  005003                          CLR     R3
   1068  013722  104010                          HLT     10              ;ERROR RECEIVER INTERUPTED BUT DONE NOT SET
   1069  013724  016401  000002          1$:     MOV     RBUF(R4),R1     ;GET CHAR
   1070  013730  042701  000200                  BIC     #200,R1         ;STRIP A BIT
   1071  013734  005701                          TST     R1              ;IS CHAR PRESENT SET
   1072  013736  100403                          BMI     2$              ;BR IF YES
   1073  013740  011402                          MOV     @RCSR,R2        ;SAVE CSR
   1074  013742  005003                          CLR     R3
   1075  013744  104010                          HLT     10              ;ERROR CHAR PRESENT NOT SET
   1076  013746  032701  070000          2$:     BIT     #ORUN+FRME+PARE,R1      ;CHECK FOR RECEIVER ERRORS
   1077  013752  001404                          BEQ     3$              ;BR IF NO ERRORS
   1078  013754  011437  011054                  MOV     @RCSR,ERCSR     ;SAVE CSR
   1079  013760  010137  011056                  MOV     R1,ERDBR        ;SAVE RBUF
   1080  013764  110177  175076          3$:     MOVB    R1,@RDA         ;STORE CHAR
   1081  013770  032777  000040  175046          BIT     #BIT5,@SWR      ;MONITOR RXDATA?
   1082  013776  001405                          BEQ     NORMON          ;BR IF NO
   1083  014000  105777  175072                  TSTB    @TPS            ;IS TTY READY?
   1084  014004  100002                          BPL     NORMON          ;BR IF NO
   1085  014006  110177  175066                  MOVB    R1,@TPB         ;TYPE CHAR
   1086  014012  005237  011066          NORMON: INC     RDA             ;INC RBUF POINTER
   1087  014016  105077  175044                  CLRB    @RDA            ;CLEAR NEXT POSITION
   1088  014022  005337  011064                  DEC     RCC             ;DEC CHAR COUNT
   1089  014026  001007                          BNE     1$              ;BUFFER FULL YET?
   1090  014030  000005                          RESET                   ;STOP THE SHOW,BUFFER OVERFLOWED
   1091  014032  005002                          CLR     R2
```

```
 014034  005003                             CLR     R3
 014036  104000                             HLT     0
 014040  104006                             HLT+6                           ;RECEIVER BUFFER FULL
 014042  000000                             HALT
 014044  000776                             BR      .-2
 014046  123701  011041            1$:      CMPB    RX.TERM,R1              ;IS CHAR 001?
 014052  001004                             BNE     RISR1                   ;BR IF NO
 014054  042714  000100                     BIC     #RIE,@RCSR              ;CLEAR RECEIVER INTERUPT ENABLE
 014060  052700  040000                     BIS     #RFLG,STAT              ;SET R DONE FLAG
 014064  005037  011032            RISR1:   CLR     TIME
 014070  005037  013562                     CLR     SNCFLG
 014074  000002                             RTI                             ;GO HOME
 014076  005015  042522  042503    MFULL:   .ASCIZ<15><12>/RECEIVER BUFFER FULL ERROR!!/
 014126     015  042412  061122    SCANE:   .ASCIZ<15><12>/ERROR!TRANSMITTER SCAN STOPPED ON WRONG LINE/
                                            .EVEN
         000001                             .END
```

M02

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DJ11 ITEP OVERLAY       MACY11 27(1006)  29-OCT-76  14:40  PAGE 27
DZDJDB.P11    05-AUG-76 09:21            CROSS REFERENCE TABLE -- USER SYMBOLS

BA         011004            577#    626
BACK       013176            723#    751#     786#     866#     897      958#
BIT0    =  000001            571#
BIT1    =  000002            571#
BIT10   =  002000            571#
BIT11   =  004000            571#
BIT12   =  010000            571#
BIT13   =  020000            571#    606#     908      935
BIT14   =  040000            571#
BIT15   =  100000            571#
BIT2    =  000004            571#
BIT3    =  000010            571#
BIT4    =  000020            571#
BIT5    =  000040            571#   1081
BIT6    =  000100            571#
BIT7    =  000200            571#
BIT8    =  000400            571#
BIT9    =  001000            571#
BSY     =  000020            571#    645
B2016      011030            587#    911
DELAY      013174            666#    675#     896#     957#     965      973#
DERR       012606            936     945#
DISPLA     011046            597#
DJ11       011000            576#
DSFLG   =  020000            571#    605#
DSSTAT     011060            612#
ENTER      012346            879     888#
EOP        012260            724     752      787      867      874#
ERCSR      011054            610#   1056#    1078#
ERDBR      011056            611#    906     1057#    1079#
ERROR1     013552           1010#   1030#
FLAG       011042            595#
FRAME   =  020000            571#   1076
FULL.D  =  000001            624#    647      826      842      847      989     1045
GO         011304            674#
HO      =  000002            571#    649
ILR     =  000010            571#    683
IRDA       011020            583#    790      915      930     1053
IXDA       011022            584#    791      914      942      984      975
KBDIN   =  104416            571#    705      736      760      825
LOOP    =  000020            571#    721      749      784      864
MFULL      014076           1104#
MOSC    =  000010            571#    644
MSG0       012620            910     951#
MSG1       012701            913     951#
MSG2       012704            937     951#
MSG3       012731            941     951#
MSG4       012754            951#    978     1042
MSG5       013106            951#
MTSE    =  000400            571#    994      998     1004     1026
NODAT   =  000200            571#    717      780      861
NOMMON     014012           1082    1084     1086#
NOXMON     013522           1019    1021     1023#
ONUN    =  040000            571#   1076
OW1     =  000002            571#    680
OW0     =  000001            571#    677
```

N02

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DJ11 ITEP OVERLAY          MACY11 27(1006)  29-OCT-76  14:40  PAGE 28
DZDJDB.P11    05-AUG-76 09:21             CROSS REFERENCE TABLE -- USER SYMBOLS

PARAM1    011012          580#    637     650     657     1006
PARAM2    011014          581#    638     647     826     842     847     989     1045
PARAM3    011016          582#
PARE   =  010000          571#    1076
PRIOR     011010          579#    633     635
PRTY0  =  000000          571#
PRTY1  =  000040          571#
PRTY2  =  000100          571#
PRTY3  =  000140          571#
PRTY4  =  000200          571#
PRTY5  =  000240          571#
PRTY6  =  000300          571#
PRTY7  =  000340          571#    875
QTPIE     012416          876#    877#    896     898#
RBUF   =  000002          571#    1058    1069
RCC       011064          615#    1054#   1088#
RCEN   =  000001          571#    643     1060
RDA       011066          616#    1053#   1080#   1086#   1087#
RDAX      012566          938#    940#
RFLG   =  040000          604#    707     720     771     783     833     859     1052    1100
RIE    =  000100          571#    1060    1099
RISR      013710          632     1063#
RISR1     014064         1098     1101#
RIV       011006          578#    631
RWAIT  =  104410          571#
RWBK   =  002000          571#    987
RX.TER    011041          593#    1097
SAVR0     013160          880#    889     951#
SAVR1     013162          881#    890     952#
SAVR2     013164          882#    891     953#
SAVR3     013166          883#    892     954#
SAVR4     013170          884#    893     955#
SAVR5     013172          885#    894     956#
SCANE     014136         1014     1104#
SCAN4     012464          916#    917     930     933
SCAN5     012540          934#
SETTLE    011024          585#
SNCFLG    013562          996     1034#   1055#   1102#
SRCSR     011052          609#
START     011102          590     628#
STARTR    013666          706     759     828     845     1040#
STARTX    013202          737     800     829     965#
STOP      013200          676#    959#    976     980#    1040    1042#
STPS   =  104414          571#    875
SWR       011044          596#    629     717     721     749     780     784     788     861     864     908     936     1018
                         1081
SW12   =  010000          571#
SXCSR     011050          608#
TCR    =  000004          571#    642#    988#
TCRTMP    013560          643#    988     1033#
TEMP1     013554          957#    969#    981#    983#    1031#   1049#   1060#
TEMP2     013556          968#    971#    982#    985#    1032#
TESTD     012400          719     782     863     906#
TESTDX    012614          919     935     929     948#
TIE    =  040000          571#    877     878     994     998     1004    1026
TIME      011032          588#    665#    674#    709     714#    738#    741     746#    770#    773     778#    799#    803
```

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DJ11 ITEP OVERLAY        MACY11 27(1006)  29-OCT-76  14:40  PAGE 29
DZDJDB.P11    06-AUG-76 09:21          CROSS REFERENCE TABLE -- USER SYMBOLS

                                808*   820*   835    840*   851    856*   860*   1027*  1101*
TKB          011074             630#
TKS          011072             619#
TPB          011100             632#   1032*  1085*
TPS          011076             631#   1030   1083
TRNFLG       01[illegible]      952*   1024   1028*  1035#
TSTOUT       01[illegible]      907    909    914#
TX.YER       011040             571#   910    1001
TYPE       = 104400             571#   910    912    927    937    939    941    943    978    1014   1042
XBUF       = 00000[illegible]   571#   1008   1010   1017*
XCC          01104[illegible]   614#
XCSR       = 00000[illegible]   571#   640*   712    744    775    805    830    854    875    878*   896*
XDN          011070             617#   752*   975*   1001   1017   1022   1023*
XFLG       = 100000             602#   773    748    801    810    821    844    849    868    974    1003
X[illegible] 012[illegible]     621    1001#
X[illegible] 012[illegible]     1002   1006#
X[illegible] 012[illegible]     1002   1009   1017#
X[illegible] 012[illegible]     1005   1022   1027#
XLP        = 00000[illegible]   571#   686    951    1047
XMIT       = 104[illegible]     571#
[illegible]  011[illegible]     [illegible]  710#   811
[illegible]  011[illegible]     [illegible]  706#   725
[illegible]  011[illegible]     [illegible]  723#   733
[illegible]  01[illegible]      [illegible]  805#   855    866
.          = 014214             575#   684    690    794    942*   970    972    984    986    997    1016   1061   1096
```

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                                                                                    C03
DJ11 ITEP OVERLAY        MACY11 27(1006)  29-OCT-76  14:40  PAGE 31
DZDJDB.P11     05-AUG-76 09:21         CROSS REFERENCE TABLE -- MACRO NAMES

BOX              18     572     599     625     961     1036
DCPARM           18
DHDOC1           18
DHPARM           18
DJPARM           18     960
DLPARM           18
DMPARM           18
DQDOC1           18
DQPARM           18
DTPARM           18
DUPPAR           18
DVDOC1           18
DYPARM           18
DZPARM           18
HELLO            18
HLT            5718     662     713     746     777     807     839     855     947     1013    1068    1075    1093    1094
SEQUAT           18     671
SINITF           18     571
SITEP            18     647
SSERV            18     614

. ABS.  014214     000

ERRORS DETECTED:  0
DEFAULT GLOBALS GENERATED:  0

 .DZDJDB,SEQ/SOL/CRF/NL:TOC=ITEP1.MAC,DZDJDB.P11
RUN-TIME: 10 13 .0 SECONDS
RUN-TIME RATIO: 49/25=1.8
CORE USED:  16K  (31 PAGES)
```